

**§572.137 Test conditions and instrumentation.**

(a) The test probe for thoracic impacts shall be of rigid metallic construction, concentric in shape, and symmetric about its longitudinal axis. It shall have a mass of  $13.97 \pm 0.023$  kg ( $30.8 \pm 0.05$  lbs) and a minimum mass moment of inertia of  $5492 \text{ kg-cm}^2$  ( $4.86 \text{ lbs-in-sec}^2$ ) in yaw and pitch about the CG.  $\frac{1}{2}$  of the weight of the suspension cables and their attachments to the impact probe must be included in the calculation of mass, and such components may not exceed three percent of the total weight of the test probe. The impacting end of the probe, perpendicular to and concentric with the longitudinal axis, must be at least 25 mm (1.0 in) long, and have a flat, continuous, and non-deformable  $152.4 \pm 0.25$  mm ( $6.00 \pm 0.01$  in) diameter face with a maximum edge radius of 12.7 mm (0.5 in). The probe's end opposite to the impact face must have provisions for mounting of an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe. No concentric portions of the impact probe may exceed the diameter of the impact face. The impact probe shall have a free air resonant frequency of not less than 1000 Hz.

(b) The test probe for knee impacts shall be of rigid metallic construction, concentric in shape, and symmetric about its longitudinal axis. It shall have a mass of  $2.99 \pm 0.01$  kg ( $6.6 \pm 0.022$  lbs) and a minimum mass moment of inertia of  $622 \text{ kg-cm}^2$  ( $0.55 \text{ lbs-in-sec}^2$ ) in yaw and pitch about the CG.  $\frac{1}{3}$  of the weight of the suspension cables and their attachments to the impact probe may be included in the calculation of mass, and such components may not exceed five percent of the total weight of the test probe. The impacting end of the probe, perpendicular to and concentric with the longitudinal axis, must be at least 12.5 mm (0.5 in) long, and have a flat, continuous, and non-deformable  $76.2 \pm 0.2$  mm ( $3.00 \pm 0.01$  in) diameter face with a maximum edge radius of 12.7 mm (0.5 in). The probe's end opposite to the impact face must have provisions for mounting an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe. No concentric portions of the impact probe

may exceed the diameter of the impact face. The impact probe must have a free air resonant frequency of not less than 1000 Hz.

(c) Head accelerometers shall have dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 and be mounted in the head as shown in drawing 880105-000 sheet 3 of 6.

(d) The upper neck force/moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S11 and be mounted in the head neck assembly as shown in drawing 880105-000, sheet 3 of 6.

(e) The thorax accelerometers shall have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 and be mounted in the torso assembly in tri-axial configuration within the spine box instrumentation cavity and as optional instrumentation in uniaxial forward-aft oriented configuration arranged as corresponding pairs in three locations on the sternum on and at the spine box of the upper torso assembly as shown in drawing 880105-000 sheet 3 of 6.

(f) The optional lumbar spine force-moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S15 and be mounted in the lower torso assembly as shown in drawing 880105-450.

(g) The optional iliac spine force transducers shall have the dimensions and response characteristics specified in drawing SA572-S16 and be mounted in the torso assembly as shown in drawing 880105-450.

(h) The pelvis accelerometers shall have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 and be mounted in the torso assembly in tri-axial configuration in the pelvis bone as shown in drawing 880105-000 sheet 3.

(i) The single axis femur force transducer (SA572-S14) or the optional multiple axis femur force/moment transducer (SA572-S29) shall have the dimensions, response characteristics, and sensitive axis locations specified in the appropriate drawing and be mounted in

the femur assembly as shown in drawing 880105–500 sheet 3 of 6.

(j) The chest deflection transducer shall have the dimensions and response characteristics specified in drawing SA572–S51 and be mounted to the upper torso assembly as shown in drawings 880105–300 and 880105–000 sheet 3 of 6.

(k) The optional lower neck force/moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572–S27 and be mounted to the upper torso assembly as shown in drawing 880105–000 sheet 3 of 6.

(l) The optional thoracic spine force/moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572–S28 and be mounted in the upper torso assembly as shown in drawing 880105–000 sheet 3 of 6.

(m) The outputs of acceleration and force-sensing devices installed in the dummy and in the test apparatus specified by this part shall be recorded in individual data channels that conform to SAE Recommended Practice J211/10, Rev. Mar95 “Instrumentation for Impact Tests;—Part 1—Electronic Instrumentation,” and SAE Recommended Practice J211/2, Rev Mar95 “Instrumentation for Impact Tests—Part 2—Photographic Instrumentation”, (refer to §§ 572.130(a)(3) and (4) respectively) except as noted, with channel classes as follows:

(1) Head acceleration—Class 1000

(2) Neck:

(i) Forces—Class 1000

(ii) Moments—Class 600

(iii) Pendulum acceleration—Class

180

(3) Thorax:

(i) Rib acceleration—Class 1000

(ii) Spine and pendulum accelerations—Class 1000

(iii) Sternum deflection -Class 180

(iv) Forces—Class 1000

(v) Moments—Class 600

(4) Lumbar:

(i) Forces—Class 1000

(ii) Moments—Class 600

(iii) Torso flexion pulling force—Class 60 if data channel is used

(5) Pelvis:

(i) Accelerations—Class 1000

(ii) Iliac wing forces—Class 180

(6) Femur forces—Class 600

(n) Coordinate signs for instrumentation polarity shall conform to the Sign Convention For Vehicle Crash Testing, Surface Vehicle Information Report, SAE J1733, 1994–12 (refer to section 572.130(a)(4)).

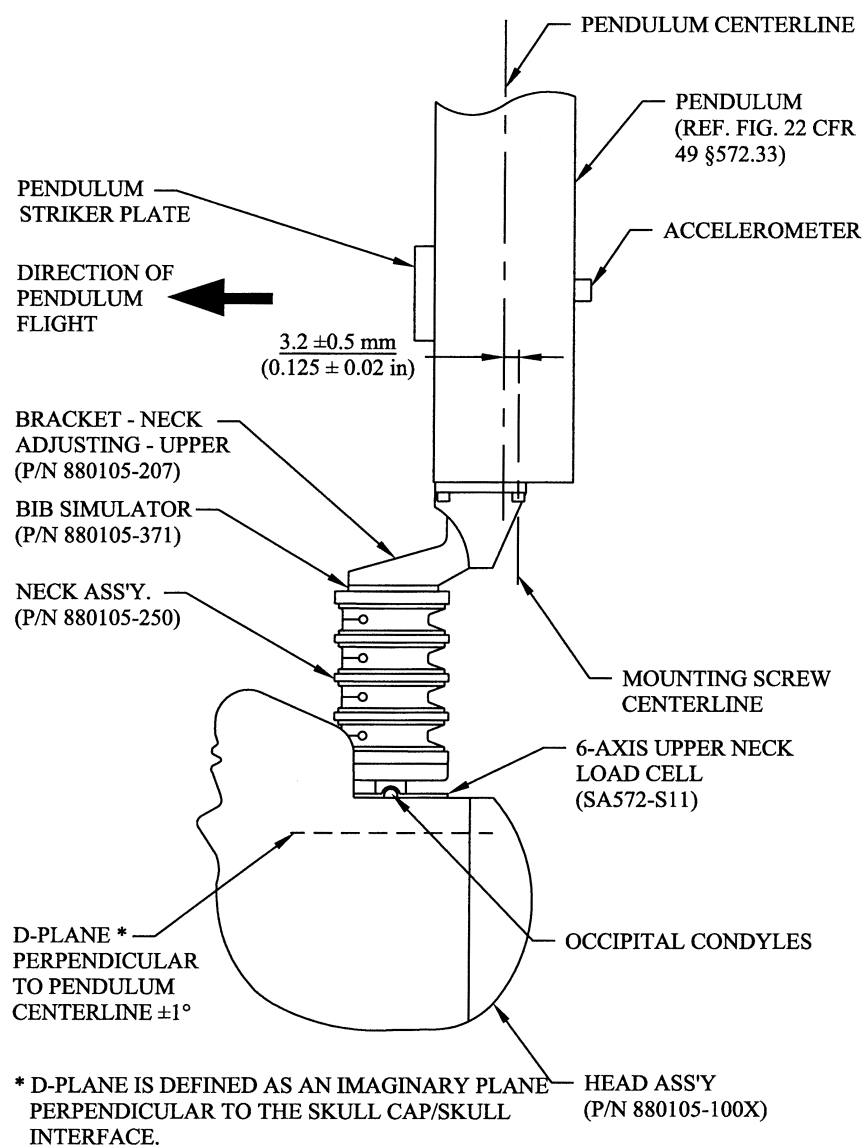
(o) The mountings for sensing devices shall have no resonance frequency less than 3 times the frequency range of the applicable channel class.

(p) Limb joints must be set at one G, barely restraining the weight of the limb when it is extended horizontally. The force needed to move a limb segment shall not exceed 2G throughout the range of limb motion.

(q) Performance tests of the same component, segment, assembly, or fully assembled dummy shall be separated in time by not less than 30 minutes unless otherwise noted.

(r) Surfaces of dummy components may not be painted except as specified in this subpart or in drawings subtended by this subpart.

FIGURE O1  
NECK FLEXION TEST SETUP SPECIFICATIONS



**FIGURE O2**  
**NECK EXTENSION TEST SETUP SPECIFICATIONS**

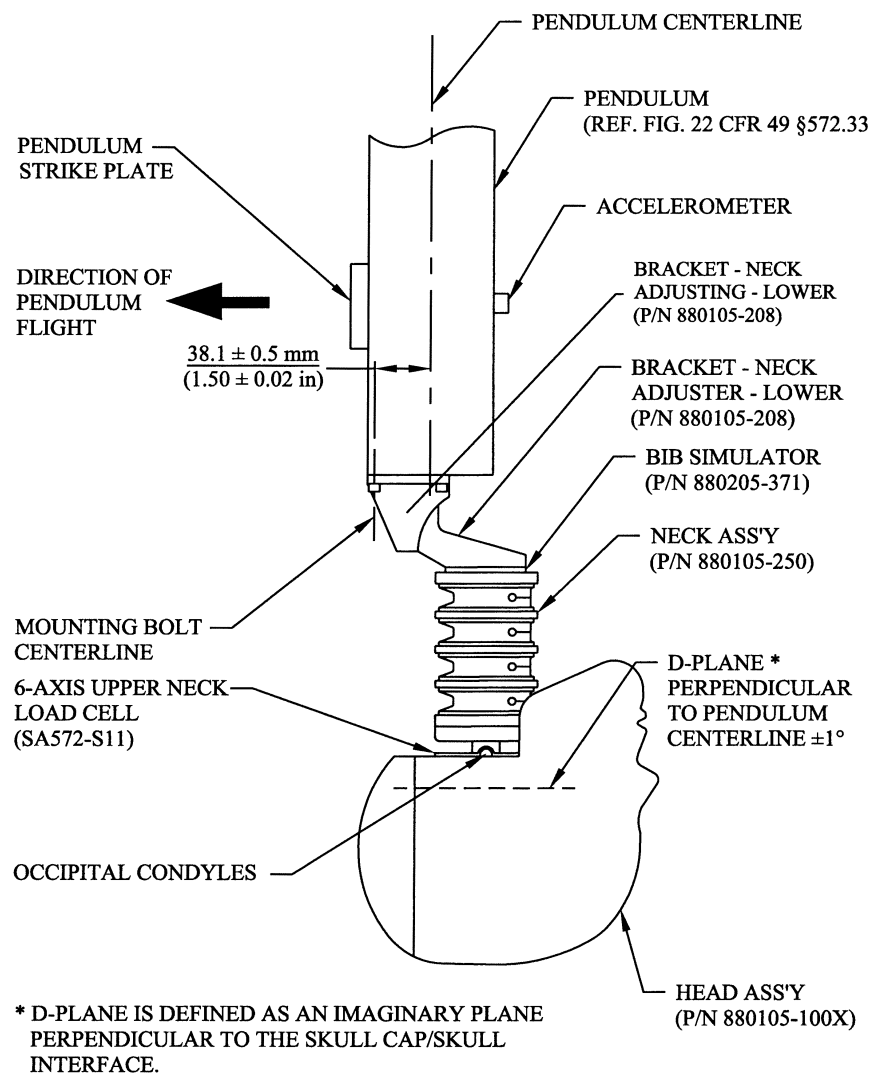




FIGURE 04

